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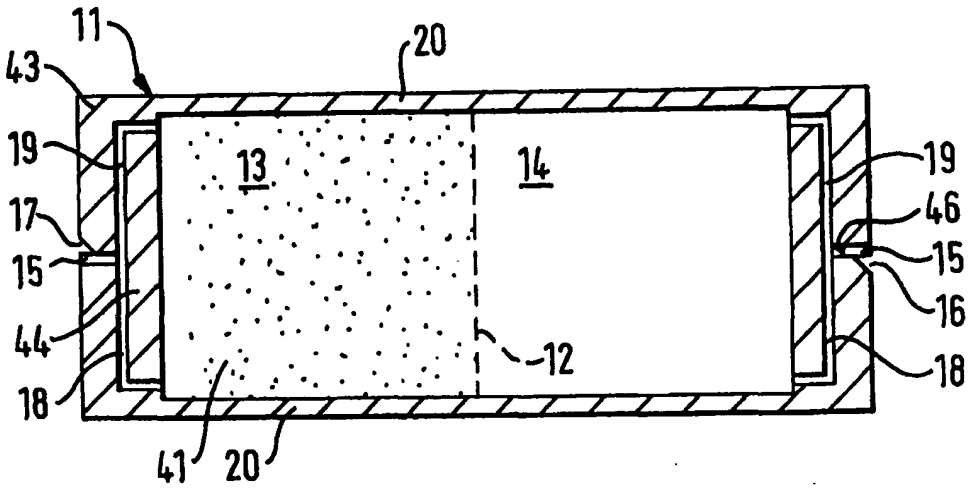
(54) Title: CLOSED FLEXIBLE SACHET



(57) Abstract

The invention relates to a closed flexible sachet (11) in the form of an individual portion provided for extraction under pressure, containg ground roast coffee (41), consisting of two identical flexible sheets or of a single folded flexible sheet of circular, oval or polygonal shape, creating a space for the coffee between the two sheets or between the two faces of the folded sheet (11), and the two sheets or the two faces of the folded sheet are welded over their periphery (20, 44) so that the said sachet is substantially symmetrical with respect to its welding plane, and the sachet is opened through the effect only of the rise in pressure which takes place upon injection of the extraction fluid, in which the two flexible sheets or the two faces of the folded sheet extend over one side of the said sachet beyond their welding line so as to provide, between the said sheets or between the two faces of the folded sheet, a channel (15) which allows the arrival of the extraction fluid, the said channel being substantially perpendicular to the welding line (44) on which it emerges.

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Closed flexible sachet

The invention relates to a closed flexible sachet in the form of an individual portion provided for extraction under pressure, containing at least one pulverulent substance for the preparation of a beverage chosen from ground roast coffee, tea, instant coffee, a mixture of instant coffee and ground coffee, a chocolate-type product or any other dehydrated edible substance, consisting of two identical flexible sheets or of a single folded flexible sheet of circular, oval or polygonal shape, creating a space for the pulverulent substance between the two sheets or between the two faces of the folded sheet, and the two sheets or the two faces of the folded sheet are welded over their periphery so that the said sachet is substantially symmetrical with respect to its welding plane, the material used for the flexible sheets is impermeable to oxygen and to water vapour in order to preserve it, and the sachet is opened through the effect only of the rise in pressure which takes place upon injection of the extraction fluid.

Patent WO 94/01344 already relates to a closed flexible sachet provided for extraction under pressure. With this sachet, at the time of extraction, one of the flexible sheets is perforated so as to allow the arrival of the extraction water. The drawback of perforating the sheet is that firstly it is necessary to guarantee the seal over the entire periphery of the sachet and, secondly, if the coffee in the sachet is not compacted, it is not always guaranteed that the said sachet will be perforated.

The object of the present invention is to develop a closed sachet provided for extraction under pressure, in which it is unnecessary to guarantee the seal over the entire periphery of the sachet at the time of extraction and which makes it possible to avoid perforating one of the two flexible sheets.

The present invention relates to a closed flexible sachet in the form of an individual portion

provided for extraction under pressure, according to the preamble of Claim 1, and in which the two flexible sheets or the two faces of the folded sheet extend over one side of the said sachet beyond their welding line so as to provide, between the said sheets or between the two faces of the folded sheet, a channel which allows the arrival of the extraction fluid, the said channel being substantially perpendicular to the welding line on which it emerges.

The presence of the channel between the two flexible sheets or between the two faces of the folded sheet makes it possible to insert therein a needle or any other sharp element allowing the extraction water to be supplied without perforating or tearing one of the flexible sheets. It is unnecessary for the needle or the sharp element to enter into the channel: it is also possible to envisage the arrival of the extraction water precisely at the entry of the said channel. In one or other alternative, the important thing is that, in the sachet according to the invention, the said sachet is not opened by inserting the needle or the sharp element to the extent of breaking the weld which closes the said sachet, but it is the pressurized water which initiates and completely opens the said weld of the sachet in order to allow the extraction liquid to enter. The water pressure is normally between 1 and 7 bar, i.e., in order to break the weld, a minimum pressure of water is required which allows the said weld to be opened up.

The method and the device which are used for the extraction of sachets according to the invention may advantageously be of the type which partially forms the subject of EP Patent Application Nos. 92107548 and 92112364. "Partially" is understood to mean that the device is used not for the arrival of the water but for the exit of the coffee. The lower face of the sachet is opened by localized ruptures after its deformation against the non-perforating and non-cutting raised and hollowed-out elements present on the lower face of the

device through the effect only of the rise in pressure which takes place upon injection of the extraction fluid.

The sachet according to the invention may be of square, rectangular, oval and other shapes. If the sachet is of rectangular shape, it has a width of approximately 2 to 15 cm, preferably of the order of 4-6 cm, and a length of from 6 to 20 cm. Depending on the size of the sachet, it is possible to envisage the extraction of a single cup or of several cups, for example of two cups. Once filled, the sachet has a thickness, at its centre, which is preferably between 5 and 20 mm. The measured amount of pulverulent substance contained may vary between 5 and 50 g, according to its use. The coffee is normally in the sachet in non-compacted form, which makes the said sachet relatively soft. It is, however, also possible to package compacted coffee. The depth of the arrival channel for the extraction fluid is normally from 3 to 10 mm and the diameter of this channel is also between 3 and 10 mm. The weld which closes the sachet normally has a depth of the order of 1 to 3 mm.

In order to accommodate the coffee on the flexible sheets or the folded flexible sheet, the sheets are moulded either by means of compression in a die/piston assembly, or by means of pressurization of the inner faces by a gas and/or suction of the outer faces. In both cases, the mould has the desired relief.

The sheets or the folded sheet may be made from flexible material such as aluminium with a thickness of from 5 to 40 microns or from plastic such as PET.

Preferably, the sheets will consist of a flexible, multi-layer material which is suitable for welding using customary methods whilst at the same time forming sufficient protection for the product against oxygen and water vapour. The following combination of materials is recommended:

- outer layer: PET (normal, woven or non-woven), PE, PP, PA, PS or paper;
- high-grade barrier central layer; aluminium with a thickness of between 5 and 20 microns, EVOH, PVDC, PET or PVA;
- inner layer: plastic, preferably PE or PP or OPP with welding lacquer. The seal is normally achieved at a temperature of between 180 and 250°C.

It is possible to envisage the following multi-layer combinations: PET-EVOH-PE or PET-aluminium-PE. The use of biodegradable or water-soluble material is also possible as a single layer or in combination with other material.

The sachet according to the invention is manufactured in the conventional manner by means of deformation by moulding or by drawing of the two flexible sheets or of the folded flexible sheet which are impermeable to oxygen and to water vapour, by measuring the amount of pulverulent substance onto one of the flexible sheets and by welding the two sheets or the two faces of the folded sheet over their periphery. The manufacturing operations are carried out under the protection of a stream of oxygen-free inert gas, for example under nitrogen or under CO_2.

The major advantage of the sachet according to the invention is that it allows the arrival of the extraction water via a small opening in the weld between the two flexible sheets or between the two faces of the folded sheet. In this context, it is possible to envisage several solutions. The channel between the two flexible sheets or between the two faces of the folded sheet may, in one version, emerge directly on the welding line and the extraction fluid then has a single path via which to arrive at the sachet. By contrast, if it is desired to improve the distribution of the flow into the bed of coffee, provision can be made for an arrival channel which is

subdivided, after the welding line of the two flexible sheets or of the two faces of the folded sheet, into at least two channels emerging at different points in the sachet: for example, in the case of a sachet for a single cup, two arrival channels are envisaged, and, in the case of a sachet for two cups, four arrival channels are envisaged.

In the sachet-extraction device, it is a sharp element which is engaged into the water-arrival channel. So as to guarantee satisfactory insertion of the said sharp element into the channel, provision is made on each flexible sheet or on each face of the folded sheet for a break at the location of the said channel, allowing separation of the said flexible sheets or of the said faces of the folded sheet at the moment the extraction device is pricked. In another embodiment, it is also possible to envisage offsetting the two faces of the folded sheet at the location of the channel. As already mentioned above, it is not obligatory for the sharp element to engage in the channel.

According to another embodiment of the sachet according to the invention, a tube, which is either adhesively bonded, or crimped or laid in position is placed in the extension of the channel. The advantage of this tube is that it facilitates the insertion of the sharp element.

At the moment of extraction of the sachet according to the invention, it is held in the extraction cavity and this guarantees satisfactory performance of the weld of the two flexible sheets. This performance is not guaranteed only at the location of the arrival channel for the extraction fluid, so that the pressure of the said fluid breaks the weld at this point, and only at this point, so as to allow the extraction water to enter into the sachet through this channel or the channels.

As already mentioned above, the sachet according to the invention needs a satisfactory seal

viz a viz the extraction fluid only at the location of the arrival channel. The consequence of this is that it facilitates the design of the extraction machine and therefore the latter's cost.

The remainder of the description is made with reference to the drawings, in which:

Fig. 1 is a plan view of a blank for manufacturing a sachet according to the invention;

Fig. 2 is a plan view of a blank in a second embodiment;

Fig. 3 is a diagrammatic plan view of the sachet during extraction;

Fig. 4 is a plan view of the sachet in a third embodiment;

Fig. 5 is a plan view of the sachet in a fourth embodiment;

Fig. 6 is a plan view of the sachet in a fifth embodiment;

Fig. 7 is a plan view of the sachet in a sixth embodiment; and

Fig. 8 is a plan view of the sachet in a seventh embodiment.

The blank (1) is a multi-layer flexible sheet based on aluminium, polyethylene and polypropylene, having a thickness of the order of 40 microns and which is foldable along the line (4). This sheet is thermoformed so as to create in it two cavities (2, 3) which make it possible to receive the ground roast coffee (40) therein. The flexible sheet is then folded along the line (4) and the two faces of the sheet are welded along the hatched lines (5, 42). This welding provides a channel (6) between the two faces, allowing the insertion of the sharp element for sachet extraction. In the case of Figure 1, there is a channel (6) emerging directly onto the bed of coffee. At the moment of use of the sachet, the water arrives via the said channel and the pressure of this water makes it possible to break the seal (45). To facilitate the insertion of the said sharp element, provision is made

for breaks (7, 8) on the two faces of the flexible sheet (1), which makes it possible, when the edge is pinched in the extraction device, satisfactorily to open up the opening of the channel (6). In the case of the figure, there is a sachet, for two cups, which has a width of 4.5 cm and a length of 9 cm in the case of each cavity (2, 3). The border (10) of the sachet which goes beyond the weld (42) has a width of from 2 to 4 cm.

In the case of Figure 2, there is a sheet (11) based on the same composite as for Figure 1, the said sheet being foldable along the line (12). It includes cavities (13, 14) for the ground roast coffee (41). The sheet is then folded over and welded along the hatched zones (20, 44) and a channel (15) is made in it which is subdivided into two channels (18, 19), allowing the water for extraction to arrive at two different points in the bed of coffee. When the water arrives, it breaks the weld in the zone (46) and thus allows sachet extraction. The breaks (16, 17) permit satisfactory opening of the channel (15) at the moment of extraction. The border (43) which goes beyond the weld (44) has a width of from 2 to 4 cm.

Figure 3 shows a sachet (20) of more oval shape, with its measured amount of coffee (21). The weld also appears in the form of hatched zones (22). The welding zone (23) forms the separation between the channel (24) and the bed of coffee (21). The sharp element (25) is displaced between its guides (26) from a set-back position to a position of engagement in the channel (24). It is from this moment onwards that the extraction fluid arrives at a pressure of between 1 and 3 bar and breaks the weld (23). The pressure in the sachet increases and the lower face of the said sachet presses against raised and hollowed-out elements which are diagrammatically represented at (27), until the said face tears at the locations of the said raised and hollowed-out elements so as to allow the coffee to flow into the cup placed beneath the extraction device.

Figure 4, finally, shows a sachet (30) which has a measured amount of coffee (31) with a weld (32), the weld (33) forming the separation between the measured amount of coffee and the channel (31) for the arrival of the extraction fluid. In this channel, provision is made for a tube (34), allowing satisfactory insertion of the sharp element.

Figure 5 shows a sachet (47) obtained from a folded-over sheet, which gives two faces (56, 57). This sachet is provided for a single cup of coffee with one measured amount of coffee (49). The weld appears in the form of hatched zones (50, 51). The welding zone (52) forms the separation between the channel (53) and the bed of coffee (49). After the weld (52), the channel (53) is subdivided into two channels (54, 55), so that the water satisfactorily moistens the coffee at two different locations. At the moment of extraction of the sachet (47), the offset of the two sheets (56, 57) allows satisfactory opening-up of the channel (53) to permit satisfactory positioning of the water-arrival channel on the said channel (53). The extraction fluid arrives at a pressure of between 1 and 4 bar and breaks the weld (52). The water then flows into the sachet and the pressure in the sachet increases, and the lower face of the said sachet presses against raised and hollowed-out elements represented diagrammatically at (58) until the said face tears at the locations of the said raised and hollowed-out elements so as to allow the coffee to flow into the cup placed beneath the extraction device.

Figure 6 shows a sachet (48) which makes it possible to prepare two cups of coffee with a measured amount of coffee (69) and a measured amount (70). The weld appears in the form of hatched zones (61, 62, 63). The welding zone (72) forms the separation between the channel (71) and the bed of coffee (69). After the weld (72), the channel (71) is subdivided into three channels: the two channels (64, 65) firstly allowing the extraction water to progress onto the bed of coffee

(69) and, secondly, a third channel (66) allowing the water to progress towards the second bed of coffee (70). This channel (66) is then itself subdivided into two channels (67, 68). At the moment the sachet is used, the extraction fluid arrives via the channel (71) at a pressure of between 1 and 4 bar and breaks the weld (72). The pressure in the sachet increases and the lower face of the said sachet presses against the raised and hollowed-out elements represented diagrammatically at (59, 60) until the said face tears at the locations of the said raised and hollowed-out elements so as to allow the coffee to flow into the two cups placed beneath the extraction device.

Figure 7 shows a sachet (73) obtained from a folded-over sheet giving two faces (74, 75). This sachet is provided for two cups of coffee with measured amounts of coffee (99, 100). The weld appears in the form of hatched zones (76, 77, 78). The welding zone (81) forms the separation between the channel (86) and the beds of coffee (99, 100). After the weld (81), the channel (86) subdivides into four channels: two channels (82, 83) for the bed of coffee (99) and two channels (84, 85) for the bed of coffee (100). At the moment of extraction of the sachet (73), the offset of the two sheets (74, 75) allows satisfactory opening-up of the channel (86) to allow satisfactory positioning of the water-arrival channel on the said channel (86). The extraction fluid arrives at a pressure of between 1 and 4 bar and breaks the weld (81). The water then flows into the sachet and the pressure in the sachet increases and the lower face of the said sachet presses against the raised and hollowed-out elements represented diagrammatically at (79, 80) until the said face tears at the locations of the said raised and hollowed-out elements so as to allow the coffee to flow into the two cups placed beneath the extraction device.

Figure 8 shows a sachet (87) which makes it possible to prepare two cups of coffee with one measured amount of coffee (101). The weld appears in

the form of hatched zones (88, 89, 90, 91). The welding zone (92) forms the separation between the channel (93) and the bed of coffee (101). After the weld (92), the channel (93) subdivides into three channels: the first two (94, 95) lead directly to the bed of coffee (101), and the third (96) conveys the water towards the bottom of the sachet. At the bottom of the sachet, it subdivides again into two channels (97, 98). In this embodiment, the water arrives at four points on the bed of coffee, which allows satisfactory moistening of the said coffee and satisfactory extraction from the sachet.

It is well understood that the sachet according to the invention may be manufactured either from two flexible sheets or from a single folded flexible sheet. The advantage of this second solution is that it dispenses with one welding zone and thus reduces the risks of a defective seal in the sachet according to the invention.

Explanation of the abbreviations:

PVDC	=	polyvinylidene chloride
EVOH	=	copolymer of ethylene and vinyl alcohol
PP	=	polypropylene
PE	=	polyethylene
PET	=	polyester
PA	=	polyamide
PS	=	polystyrene
OPP	=	oriented polypropylene
PVA	=	polyvinylacetate

Claims

1. Closed flexible sachet in the form of an individual portion provided for extraction under pressure, containing at least one pulverulent substance for the preparation of a beverage chosen from ground roast coffee, tea, instant coffee, a mixture of instant coffee and ground coffee, a chocolate-type product or any other dehydrated edible substance, consisting of two identical flexible sheets or of a single folded flexible sheet of circular, oval or polygonal shape, creating a space for the pulverulent substance between the two sheets or between the two faces of the folded sheet, and the two sheets or the two faces of the folded sheet are welded over their periphery so that the said sachet is substantially symmetrical with respect to its welding plane, the material used for the flexible sheets is impermeable to oxygen and to water vapour in order to preserve it, and the sachet is opened through the effect only of the rise in pressure which takes place upon injection of the extraction fluid, characterized in that the two flexible sheets or the two faces of the folded sheet extend over one side of the said sachet beyond their welding line so as to provide, between the said sheets or between the two faces of the folded sheet, a channel which allows the arrival of the extraction fluid, the said channel being substantially perpendicular to the welding line on which it emerges.

2. Sachet according to Claim 1, characterized in that the material for the flexible sheets or for the folded sheet is chosen from aluminium, PET, PE, PP, PA, PS, paper, EVOH, PVDC and PVA, the said sheets being single-layer or multi-layer sheets.

3. Sachet according to one of Claims 1 or 2, characterized in that the channel emerges directly on the welding line.

4. Sachet according to one of Claims 1 or 2, characterized in that the channel is subdivided after the welding line into at least two channels emerging at different points of the sachet.

5. Sachet according to one of Claims 1 to 4, characterized in that, in the extension of the channel, each flexible sheet or each face of the folded sheet comprises a break allowing a separation of the said flexible sheets.

6. Sachet according to one of Claims 1 to 4, characterized in that, in the extension of the channel, each sheet is offset to allow a separation of the said flexible sheets.

7. Sachet according to Claim 1, characterized in that the channel comprises a tube which is adhesively bonded, crimped or laid in position.

8. Sachet according to one of Claims 1 to 7, characterized in that the weld of the two flexible sheets or of the folded sheet is such that it opens under an injection-fluid pressure of between 1 and 7 bar.

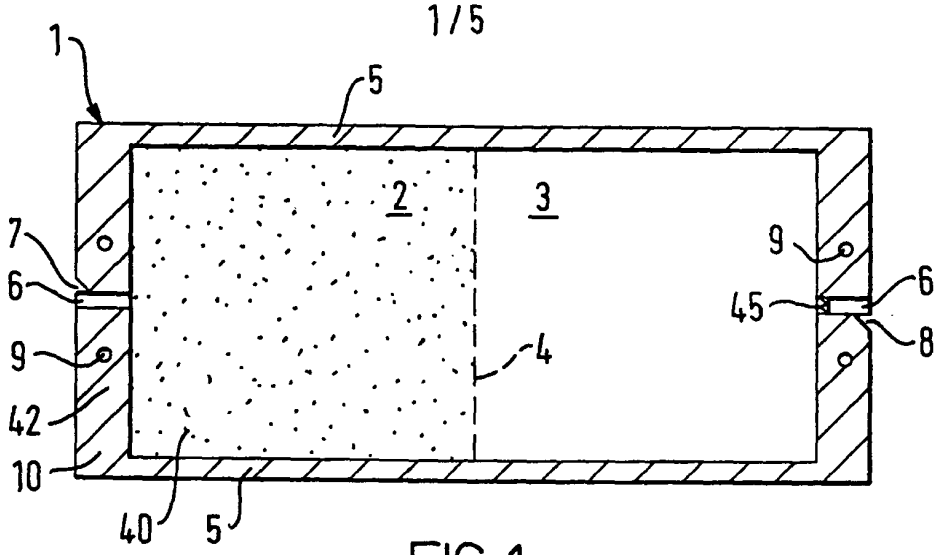
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FIG. 1

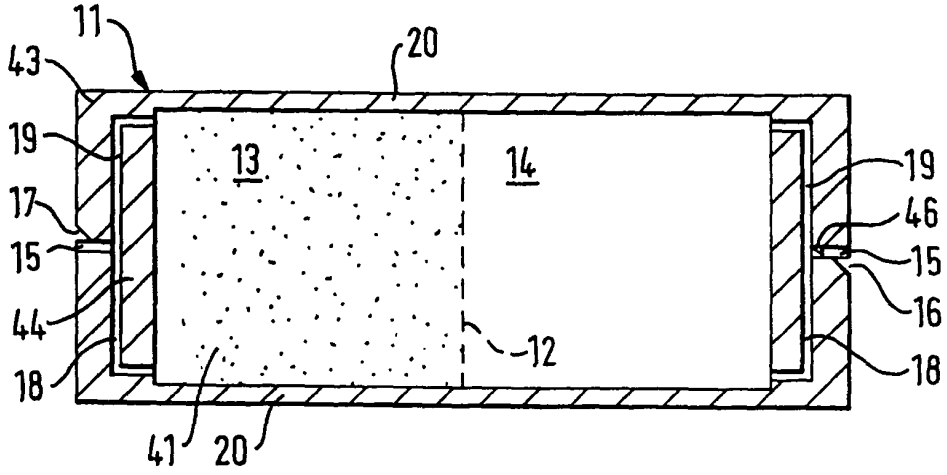
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FIG. 2

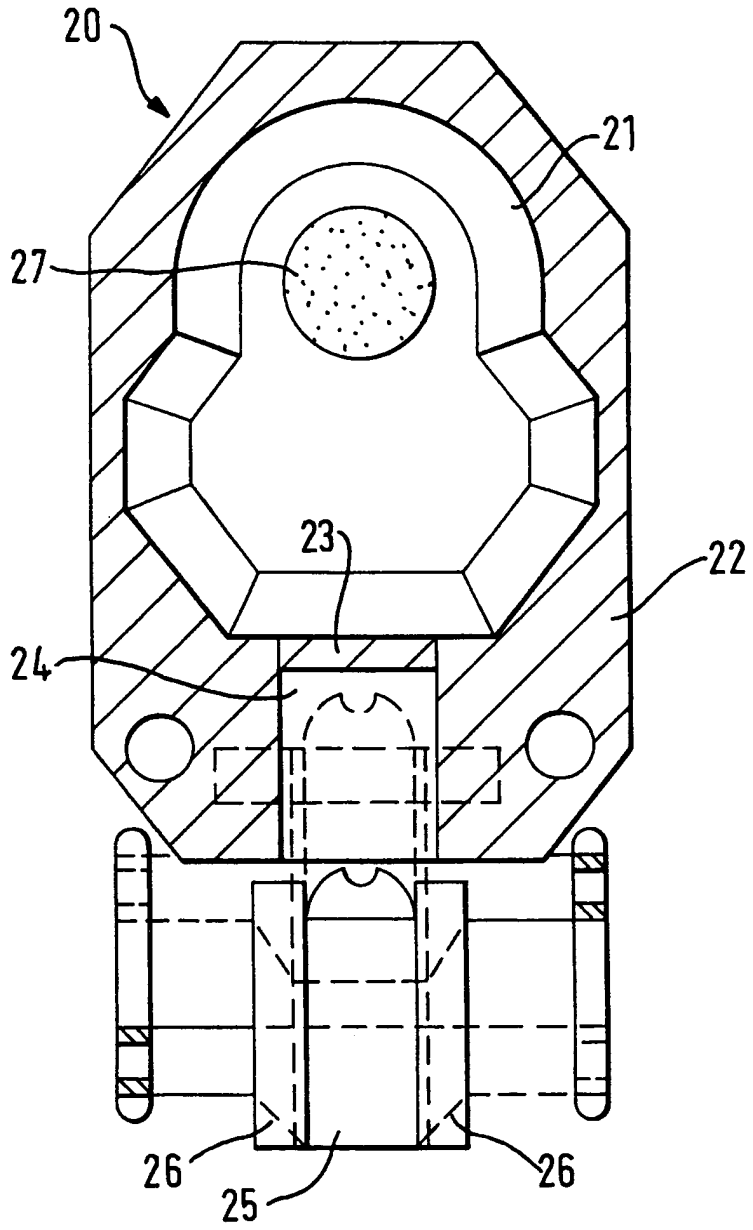

FIG. 3

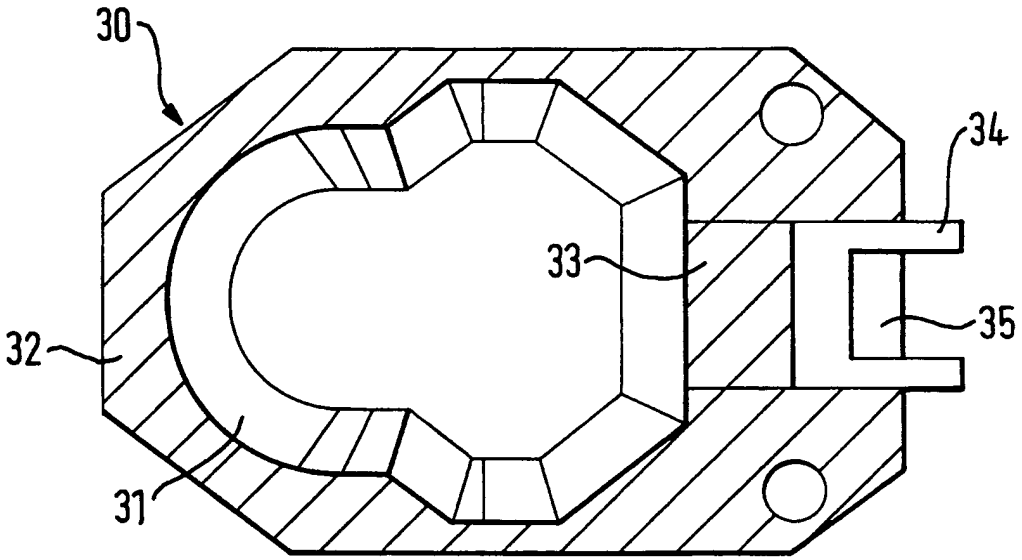

FIG. 4

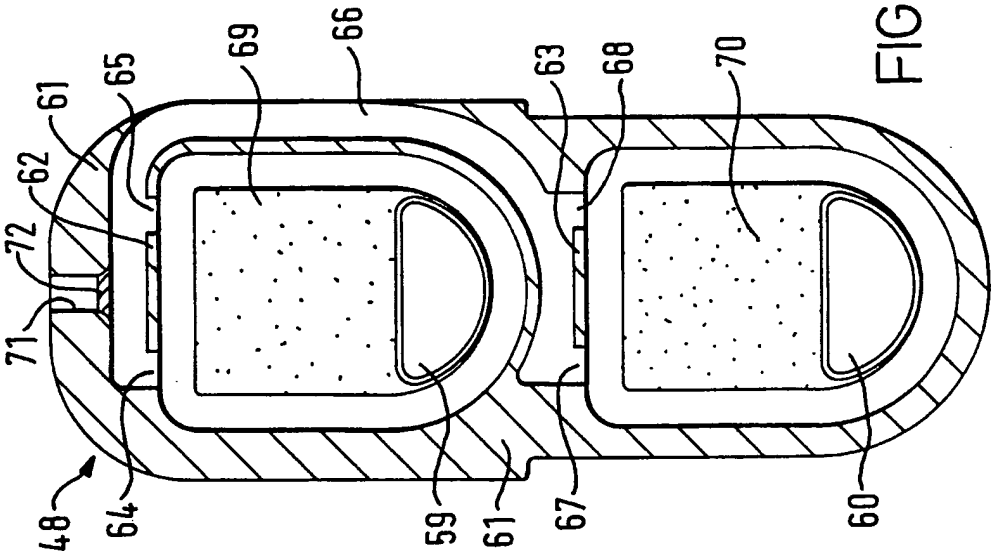
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FIG. 6

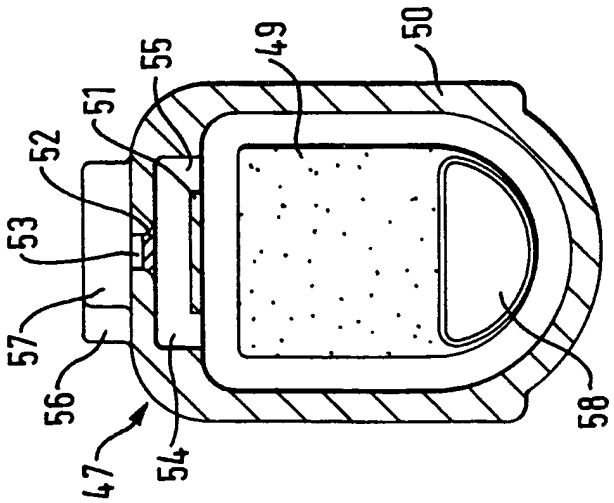
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FIG. 5

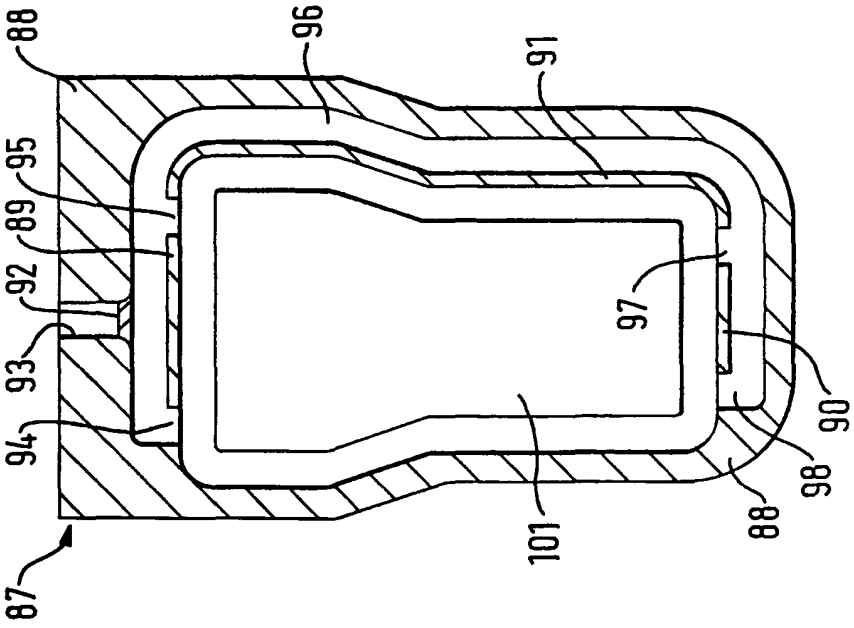
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FIG. 8

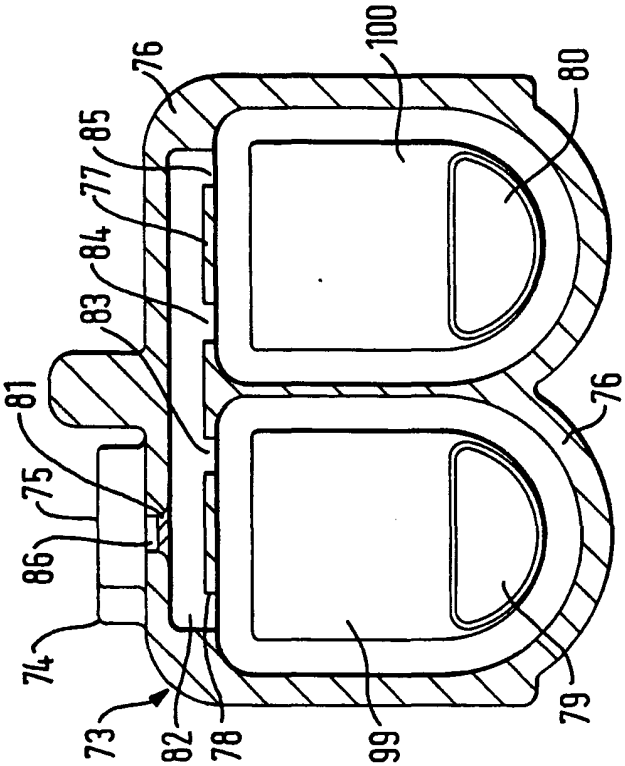
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FIG. 7

INTERNATIONAL SEARCH REPORT

Ir .ational Application No
PCT/EP 98/03826

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65D81/00

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B65D A47J

Documentation searched other than minimumdocumentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 228 374 A (TCHAKIRIAN) 29 November 1974 see page 2, line 7 - line 26; figures 1,2	1
A	GB 2 215 189 A (MARS) 20 September 1989 see page 1, line 32 - page 3, line 8; figure	1
A	US 4 220 259 A (LAGNEAX) 2 September 1980 see column 3, line 7 - column 4, line 29; figures	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of theinternational search	Date of mailing of the international search report
15 October 1998	26/10/1998

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Ir ational Application No
PCT/EP 98/03826

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